

Appendix I

Initial CHART Assessment for the Upper Columbia River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Dale Bambrick (CHART Leader), Dennis Carlson, and Lynn Hatcher. CHART members also included Ken McDonald from the U.S. Forest Service and Jim Craig from the U.S. Fish and Wildlife Service.

ESU Description

The Upper Columbia River steelhead ESU includes all naturally spawned populations of steelhead in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Upper Columbia River *O. mykiss* ESU.

Unlike Pacific salmon, steelhead are capable of spawning more than once before death. However, it is rare for steelhead to spawn more than twice before dying, and most that do so are females. Steelhead can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Fish in the Upper Columbia River steelhead ESU are made up entirely of summer steelhead.

Upper Columbia River steelhead spawn in cool, clear streams with suitable gravel size, depth, and current velocity. They sometimes also use smaller streams for spawning. The adult steelhead enter fresh water between May and October. During summer and fall before spawning, they hold in cool, deep pools. They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration to natal streams in early spring, and then spawn. In general, adults in this ESU spawn later than in most downstream populations—often remaining in fresh water for a year before spawning.

Depending on water temperature, steelhead eggs may incubate for 1.5 to four months before hatching. Rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Some older juveniles move

downstream to rear in larger tributaries and mainstem rivers. Productive steelhead habitat is characterized by complexity—primarily in the form of large and small wood.

The dry habitat conditions in the Upper Columbia River are less conducive to steelhead survival than in many other parts of the Columbia River Basin. Although the life history of this ESU is similar to that of other inland steelhead, smolt ages are some of the oldest on the West Coast (up to seven years old), probably due to the area's cold water temperatures. The cold stream temperatures also lead to the possibility that many fish in this ESU may be thermally-fated to a resident (rainbow trout) life history regardless of whether they are the progeny of resident or anadromous parents. Most current natural production occurs in the Wenatchee and Methow River systems, with a smaller run returning to the Entiat River. Very limited spawning also occurs in the Okanogan River Basin. Most of the fish spawning in natural production areas are of hatchery origin. They limited data available indicate that smolt age in the this ESU is dominated by 2-year-olds. It also appears that steelhead from the Wenatchee and Entiat Rivers return to fresh water after one year in salt water, whereas Methow River steelhead primarily return after two years of ocean residence.

CHART Area Assessments and Initial Conservation Value Ratings

The CHART assessment for this ESU addressed 10 subbasins containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Subbasins were chosen as freshwater critical habitat units because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (also called "strata") in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). The ICBTRT (2003) did not identify separate major groupings/strata for this ESU due to the relatively small size of the area. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of a single population group.

Unit 1. Chief Joseph Subbasin (HUC4# 17020005)

The Chief Joseph subbasin is located in north-central Washington and contained in Chelan, Douglas and Okanogon counties, Washington. The subbasin contains five watersheds, three of which are occupied by the ESU. These watersheds encompass approximately 817 mi² and 1,493 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 42 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Methow River and Okanogan River)

occupying this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that one of the occupied watersheds (Upper Columbia/Swamp) was of medium conservation value to the ESU overall but still contained a high value migration corridor for the Methow River and Okanogan River populations, connecting upstream watersheds with downstream reaches and the ocean. The other two occupied watersheds in this subbasin were of low conservation value to this ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 2. Okanogan Subbasin (HUC4# 17020006)

The Okanogan subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogan County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 2,650 mi² and 3,928 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 131 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Okanogan River) occupying this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the five HUC5s reviewed, two were rated as having high and three were rated as having medium conservation value. The CHART also concluded that the HUC5s with a medium overall rating contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. The CHART also believed that Loup Loup Creek (Lower Okanogan HUC5) may be occupied by this ESU based on maps/information contained in a report by the Washington State

Conservation Commission and Northwest Indian Fisheries Commission (2003). Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 3. Similkameen Subbasin (HUC4# 17020007)

The Similkameen subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains four watersheds, one of which (Lower Similkameen River) is occupied by the ESU. This watershed encompasses approximately 69 mi² and 167 miles of streams. Historically occupied areas in this subbasin are now blocked by Enloe Dam. Fish distribution and habitat use data from WDFW identify approximately 4 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Okanogan River) occupying this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied reaches in the Lower Similkameen HUC5 watershed was of high conservation value to the ESU. The CHART also concluded that historically occupied areas upstream of Enloe Dam may be essential for the conservation of the ESU. The CHART noted that a recent report describing habitat and fish conditions in this subbasin (Talayco 2002) observed that Enloe Dam blocks access to more than 95 percent of the potential anadromous fish habitat in the Similkameen River and that there is "significant potential for increasing spawning and rearing habitat available to anadromous fish in this subbasin by addressing passage barriers such as Enloe Dam." This report also noted that "recently there has been interest in relicensing the Enloe Dam, and fish passage alternatives are being investigated." Therefore, the CHART concluded that the ESU would likely benefit if the extant population had access to spawning/rearing habitat upstream and that these areas may warrant consideration as critical habitat. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 4. Methow Subbasin (HUC4# 17020008)

The Methow subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains

seven watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 1,823 mi² and 6,726 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 216 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Methow River) occupying this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 5. Lake Chelan Subbasin (HUC4# 17020009)

The Lake Chelan subbasin is located in central Washington and contained entirely in Chelan County, Washington. The subbasin contains two watersheds, only one of which is occupied by the ESU. This watershed encompasses approximately 262 mi² and 970 miles of stream/lake reaches. Most of these reaches are above the Lake Chelan gorge and were likely historically inaccessible to anadromous fish. Fish distribution and habitat use data from WDFW identify approximately one mile of occupied riverine habitat in the lowermost reach of this watershed (WDFW 2003). The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin but Kaputa (2002) noted a priority management goal for the Chelan River is to provide spawning and rearing habitat for steelhead in Reach 4 (near the confluence of the Columbia River). Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of medium conservation value to the ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 6. Upper Columbia/Entiat Subbasin (HUC4# 17020010)

The Upper Columbia/Entiat subbasin drains the eastern Cascade Range in central Washington. Occupied watersheds in this subbasin are contained in Chelan, Douglas, Grant and Kittitas counties in Washington. The subbasin contains four watersheds, all of which are occupied by the ESU. These watersheds encompass approximately 1,491 mi² and 4,715 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 185 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCE distribution in the Mad River may be less than shown and only include reaches upstream to vicinity of Hornet Creek (i.e., near the upstream extent of spawning/rearing reaches shown in Map B6). However, this issue was not resolved by the time of this report. All four demographically independent populations in this ESU (Okanogan River, Methow River, Entiat River, and Wenatchee River) occupy this subbasin (ICBTRT 2003). Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium (Lake Entiat) conservation value to the ESU. The CHART also concluded that while the tributary habitats in the Lake Entiat HUC5 were of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 7. Wenatchee Subbasin (HUC4# 17020011)

The Wenatchee subbasin drains the eastern Cascade Range in central Washington and is contained in Chelan County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. The subbasin encompasses approximately 1,328 mi² and 4,170 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 242 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the WDFW GIS data (WDFW 2003). The Team noted in particular that steelhead in Icicle Creek (Icicle/Chumstick HUC5) are passed above the hatchery and likely get upstream as far as the confluence of French Creek. This extended distribution is depicted in Map B7

as containing at least migration PCEs (with spawning/rearing PCEs likely as well). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Wenatchee River) occupying this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium conservation value to the ESU. Of the five HUC5s reviewed, four were rated as having high and one (Icicle/Chumstick) was rated as having medium conservation value. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 8. Moses Coulee Subbasin (HUC4# 17020012)

The Moses Coulee subbasin is located in central Washington and contained in Douglas and Grant counties, Washington. The subbasin contains two watersheds, one of which (Rattlesnake Creek) is occupied by the ESU. This watershed encompasses approximately 218 mi² and 569 miles of streams. Fish distribution and habitat use data from WDFW identify approximately one mile of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of low conservation value to the ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 9. Lower Crab Subbasin (HUC4# 17020015)

The Lower Crab subbasin is located in south-central Washington and occupied watersheds are contained in Adams and Grant counties, Washington. The subbasin contains eight watersheds, only one of which (Lower Crab Creek) is occupied by the

ESU. This watershed encompasses approximately 400 mi² and 867 miles of streams. Fish distribution and habitat use data from WDFW identified very little occupied riverine habitat in the subbasin (WDFW 2003). However, the CHART concluded that this was inaccurate and cited distribution information in Quinn (2001) that steelhead likely spawn further upstream (approximately 54 miles) in Crab Creek. The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of medium conservation value to the ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 10. Upper Columbia/Priest Rapids Subbasin (HUC4# 17020016)

The Upper Columbia/Priest Rapids subbasin is located in south-central Washington and contained in Adams, Benton, Franklin, Grant, Kittitas, and Yakima counties in Washington. The subbasin contains six watersheds, three of which are occupied by the ESU. Occupied watersheds encompasses approximately 929 mi² and 1,599 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 113 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the WDFW GIS data (WDFW 2003). The Team noted that in the Yakima/Hansen Creek HUC5 that (1) steelhead in Hanson Creek likely spawn as far upstream as the confluence of Cottonwood Creek, and (2) steelhead in Alkali Canyon Creek likely spawn in reaches located approximately halfway to the first major fork in this drainage. This extended distribution is depicted in Map B10 as containing at least migration PCEs (with spawning/rearing PCEs likely as well). Also, two of the HUC5s (1605 and 1606) were preliminarily rated as medium but are now considered high due to their sole contribution as rearing/migration corridors (i.e., no tributary habitat). All four demographically independent populations identified by the Interior Columbia Basin TRT (2003) occupy this subbasin. Table I1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I10 depicts the

specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high (Yakima/Hanson Creek) and medium (Middle Columbia/Priest Rapids and Columbia River/Zintel Canyon) conservation value to the ESU. Table I2 summarizes the CHART's PCE/watershed scores and initial conservation value ratings, and Figure I1 shows the overall distribution of ratings by HUC5 watershed.

Unit 11. Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, NOAA Fisheries defines the Columbia River corridor as that segment from the confluence of the Yakima and Columbia rivers downstream to the Pacific Ocean. This confluence is located in the Columbia River/Zintel Canyon HUC5 which was the furthest downstream HUC5 with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 330 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). This corridor overlaps with the following counties: Clatsop, Columbia, Gilliam, Hood River, Morrow, Multnomah, Sherman, Umatilla, and Wasco counties in Oregon, and Benton, Clark, Cowlitz, Franklin, Klickitat, Skamania, Wahkiakum, and Walla Walla counties in Washington.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

References and Sources of Information

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Table I1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Columbia River Steelhead ESU

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Spawning / Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Presence/ Migration Only PCEs (mi)*	Management Activities**
<u>I1</u>	Chief Joseph	Foster Creek	1702000503	0.0	0.0	0.9	A, Fi
<u>I1</u>	Chief Joseph	Jordan/Tumwater	1702000504	0.0	4.2	0.0	A, D, F, Fi, G, R
<u>I1</u>	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	31.3	5.6	0.0	A, D, F, Fi, G, R
<u>I2</u>	Okanogan	Upper Okanogan River	1702000601	32.7	0.0	0.0	A, F, Fi, G, I, M, R
<u>I2</u>	Okanogan	Okanogan River/Bonaparte Creek	1702000602	16.5	0.0	0.0	A, F, Fi, G, M, R
<u>I2</u>	Okanogan	Salmon Creek	1702000603	17.0	0.0	0.0	A, F, Fi, G, I, R
<u>I2</u>	Okanogan	Okanogan River/Omak Creek	1702000604	29.5	0.0	0.0	A, F, Fi, G, M, R, U
<u>I2</u>	Okanogan	Lower Okanogan River	1702000605	25.9	0.0	0.0	A, F, Fi, G, R
<u>I3</u>	Similkameen	Lower Similkameen River	1702000704	3.8	0.0	0.0	A, D, F, Fi, G, M, R
<u>I4</u>	Methow	Lost River	1702000801	3.3	0.0	4.1	F, Fi
<u>I4</u>	Methow	Upper Methow River	1702000802	3.5	0.0	6.0	F, Fi, G, I
<u>I4</u>	Methow	Upper Chewuch River	1702000803	19.7	0.0	0.0	F, Fi, R
<u>I4</u>	Methow	Lower Chewuch River	1702000804	3.3	0.0	25.8	A, F, Fi, G, R, I
<u>I4</u>	Methow	Twisp River	1702000805	9.4	0.0	29.7	F, Fi, G, R, I
<u>I4</u>	Methow	Middle Methow River	1702000806	4.6	0.1	57.9	A, F, Fi, G, M, R, I
<u>I4</u>	Methow	Lower Methow River	1702000807	18.7	0.1	29.8	F, Fi, G, M, R
<u>I5</u>	Lake Chelan	Lower Chelan	1702000903	0.5	0.0	0.5	A, D, F, Fi, G, R
<u>I6</u>	Upper Columbia/Entiat	Entiat River	1702001001	19.8	5.2	35.6	F, Fi, G, R, I
<u>I6</u>	Upper Columbia/Entiat	Lake Entiat	1702001002	54.7	0.8	0.0	A, D, F, Fi, G, M, R, U
<u>I6</u>	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	33.5	3.7	7.4	A, D, F, Fi, G, M, R
<u>I6</u>	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	23.5	0.0	1.1	A, D, Fi, G, M

17	Wenatchee	White River	1702001101	3.6	11.2	20.2	F, Fi
17	Wenatchee	Chiwawa River	1702001102	0.6	4.2	37.5	F, Fi, R
17	Wenatchee	Nason/Tumwater	1702001103	5.5	2.4	56.3	F, Fi, R
17	Wenatchee	Icicle/Chumstick	1702001104	22.8	2.1	20.1	A, F, Fi, G, M, R, U
17	Wenatchee	Lower Wenatchee River	1702001105	14.6	39.9	1.0	A, F, Fi, G, I, M, R, U
18	Moses Coulee	Rattlesnake Creek	1702001204	0.3	0.6	0.0	A, Fi, G, R
19	Lower Crab	Lower Crab Creek	1702001509	54.2	0.0	0.0	A, Fi, G, I
110	Upper Columbia/Priest Rapids	Yakima/Hansen Creek	1702001604	43.2	0.0	0.0	A, D, F, Fi, G, M
110	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	35.5	0.0	0.0	A, Fi, G
110	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	34.6	0.0	0.0	A, D, Fi, R, U
	Multiple	Columbia River corridor	NA	0.0	330	0.0	C, D, I, R, T, U, W

* Some streams classified as “Presence/Migration Only PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm species use type.

** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Andonaegui (1999, 2000, 2001, and 2003), Quigley et al. (2001), and land use/land cover GIS layers from the U.S. Geological Survey.

Table I2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Steelhead ESU

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I1	Chief Joseph	Foster Creek	1702000503	5	Low-moderate HUC5 score; spawning/rearing PCEs in this HUC5 not identified as supporting a TRT demographically independent population	Low
I1	Chief Joseph	Jordan/Tumwater	1702000504	5	Low-moderate HUC5 score; spawning/rearing PCEs in this HUC5 not identified as supporting a TRT demographically independent population	Low
I1	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	8	Moderate HUC5 score; PCEs support two TRT demographically independent populations; the medium HUC5 rating pertains to reaches upstream of the Okanogon/Columbia confluence – reaches downstream of this confluence are a high value rearing/migration corridor	Medium

¹⁰ PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report.

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
<u>12</u>	Okanogan	Upper Okanogan River	1702000601	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCE quality in uppermost Okanogan subbasin not as high as downstream HUC5s but does contain a high value rearing/migration corridor for a high value HUC5 upstream	Medium
<u>12</u>	Okanogan	Okanogan River/Bonaparte Creek	1702000602	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCE quality in uppermost Okanogan subbasin not as high as downstream HUC5s but does contain a high value rearing/migration corridor for a high value HUC5 upstream	Medium
<u>12</u>	Okanogan	Salmon Creek	1702000603	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; this HUC5 likely contains some of the highest quality PCEs remaining for this population	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I2	Okanogan	Okanogan River/Omak Creek	1702000604	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; this HUC5 likely contains some of the highest quality PCEs remaining for this population as well as a high value rearing/migration corridor for upstream HUC5s	High
I2	Okanogan	Lower Okanogan River	1702000605	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; HUC5 contains a high value rearing/migration corridor for upstream HUC5s; CHART believed that Loup Loup Creek may be occupied	Medium
na	Similkameen	Sinlahekin Creek	1702000703	*	HUC5 not currently occupied so not scored; however, CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation	Possibly High
I3	Similkameen	Lower Similkameen River	1702000704	8*	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I4	Methow	Lost River	1702000801	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids as well as an ICBEMP priority area for steelhead; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
I4	Methow	Upper Methow River	1702000802	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I4	Methow	Upper Chewuch River	1702000803	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
I4	Methow	Lower Chewuch River	1702000804	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I4	Methow	Twisp River	1702000805	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
I4	Methow	Middle Methow River	1702000806	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids as well as an ICBEMP priority area for steelhead; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
<u>I4</u>	Methow	Lower Methow River	1702000807	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
<u>I5</u>	Lake Chelan	Lower Chelan	1702000903	6	Low-moderate HUC5 score; not identified as supporting a TRT demographically independent population; PCEs quantity very limited in this HUC5 but a priority management goal for the Chelan River is to provide spawning and rearing habitat for steelhead in lowermost reach	Medium
<u>I6</u>	Upper Columbia/Entiat	Entiat River	1702001001	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU and overlap with FEMAT key watershed for at-risk anadromous salmonids; this HUC5 contains majority of spawning PCEs for this population	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
I6	Upper Columbia/Entiat	Lake Entiat	1702001002	10	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; medium rating associated with relatively limited tributary PCEs in this HUC5	Medium
I6	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	10	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High
I6	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	10	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
17	Wenatchee	White River	1702001101	14	High HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids	High
17	Wenatchee	Chiwawa River	1702001102	15	Highest HUC5 score for entire ESU; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids	High
17	Wenatchee	Nason/Tumwater	1702001103	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; some PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; HUC5 also contains high value rearing/migration PCEs for upstream HUC5s	High

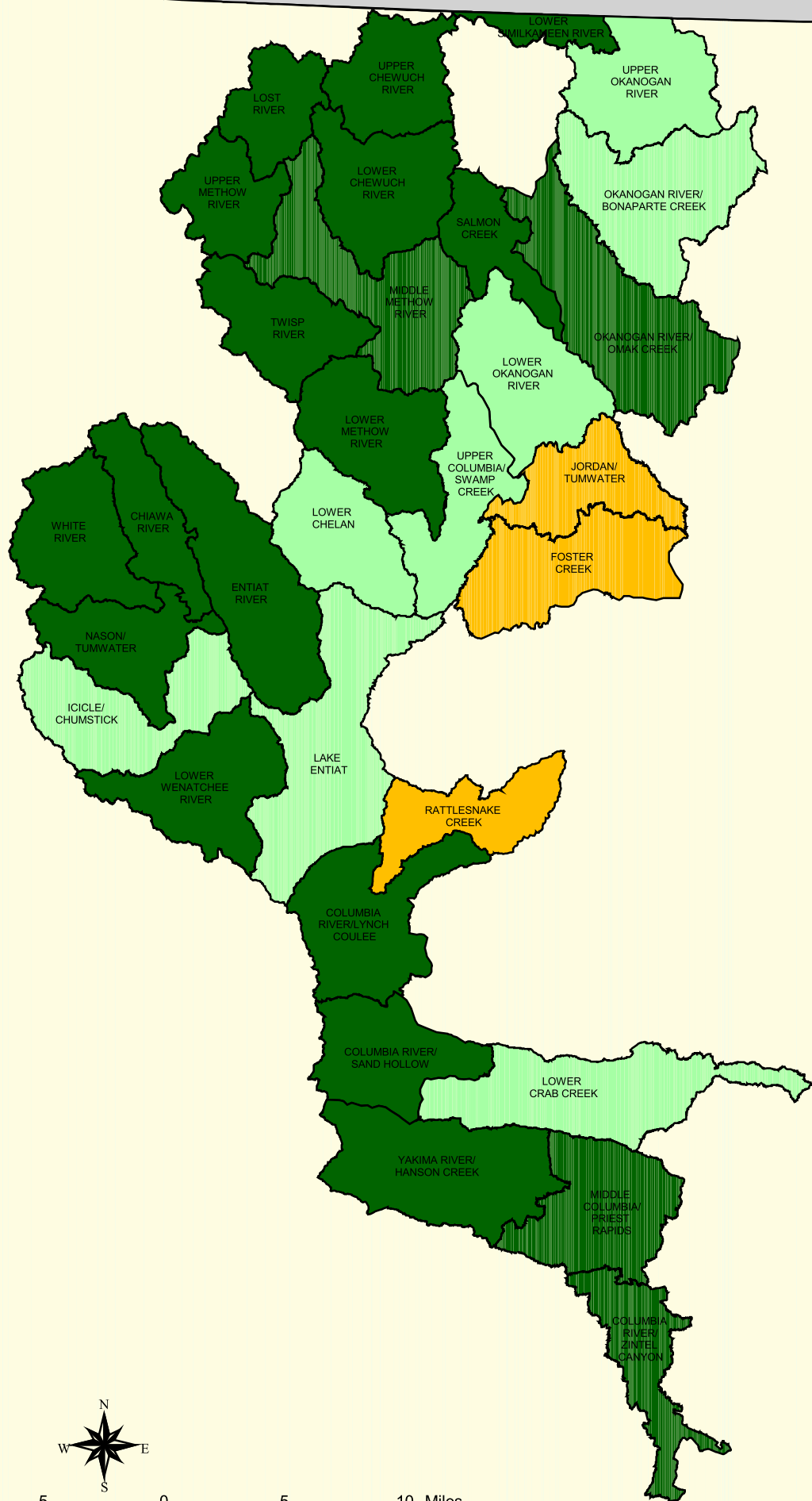
Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
17	Wenatchee	Icicle/Chumstick	1702001104	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; CHART determined that tributary PCEs here were likely of lowest quality and quantity and may not have as high a conservation value as others supporting this population; this HUC5 does contain high value rearing/migration PCEs for upstream HUC5s	Medium
17	Wenatchee	Lower Wenatchee River	1702001105	11	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; some PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; HUC5 contains high value rearing/migration PCEs for all HUC5s supporting this population	High
18	Moses Coulee	Rattlesnake Creek	1702001204	4	Low-moderate HUC5 score, lowest of all HUC5s in this ESU; very limited habitat here and HUC5 not identified as part of a TRT demographically independent population	Low

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
19	Lower Crab	Lower Crab Creek	1702001509	9	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	Medium
110	Upper Columbia/Priest Rapids	Yakima/Hansen Creek	1702001604	10	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs (including tributaries) and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High
110	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	9	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; CHART noted that this HUC5 likely unique in that it contains mainstem spawning PCEs	High

Map Code	Subbasin	Watershed/ Corridor	HUC5 Code	Total HUC5 Score (0-18) ¹⁰	Comments/Other Considerations	Initial CHART Rating of Conservation Value
110	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	9	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; CHART noted that this HUC5 likely unique in that it contains mainstem spawning PCEs	High
	Multiple	Columbia River corridor	NA	ns	Area not scored since CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

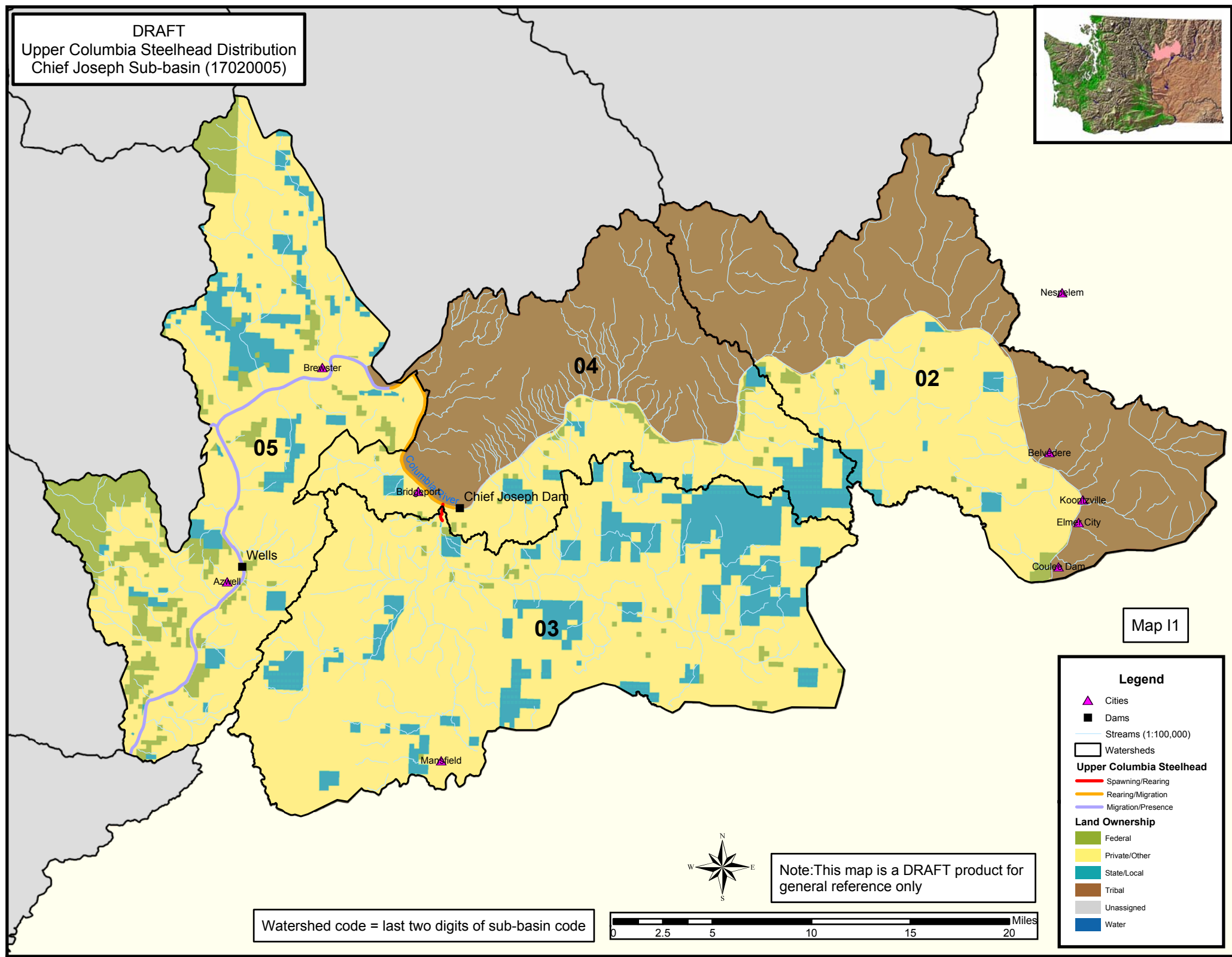
* Indicates that HUC5 may contain additional occupied areas or contain blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation. See Unit Description text for specific areas considered.

Figure I1. Initial CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Steelhead ESU



Maps I1 through I10. Upper Columbia River Steelhead ESU – Habitat Areas Under Consideration for Critical Habitat Designation (note: the Columbia River corridor is not shown but is under consideration as described in the text)

DRAFT
Upper Columbia Steelhead Distribution
Chief Joseph Sub-basin (17020005)



Map I1

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

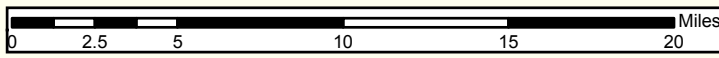
Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water



Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code

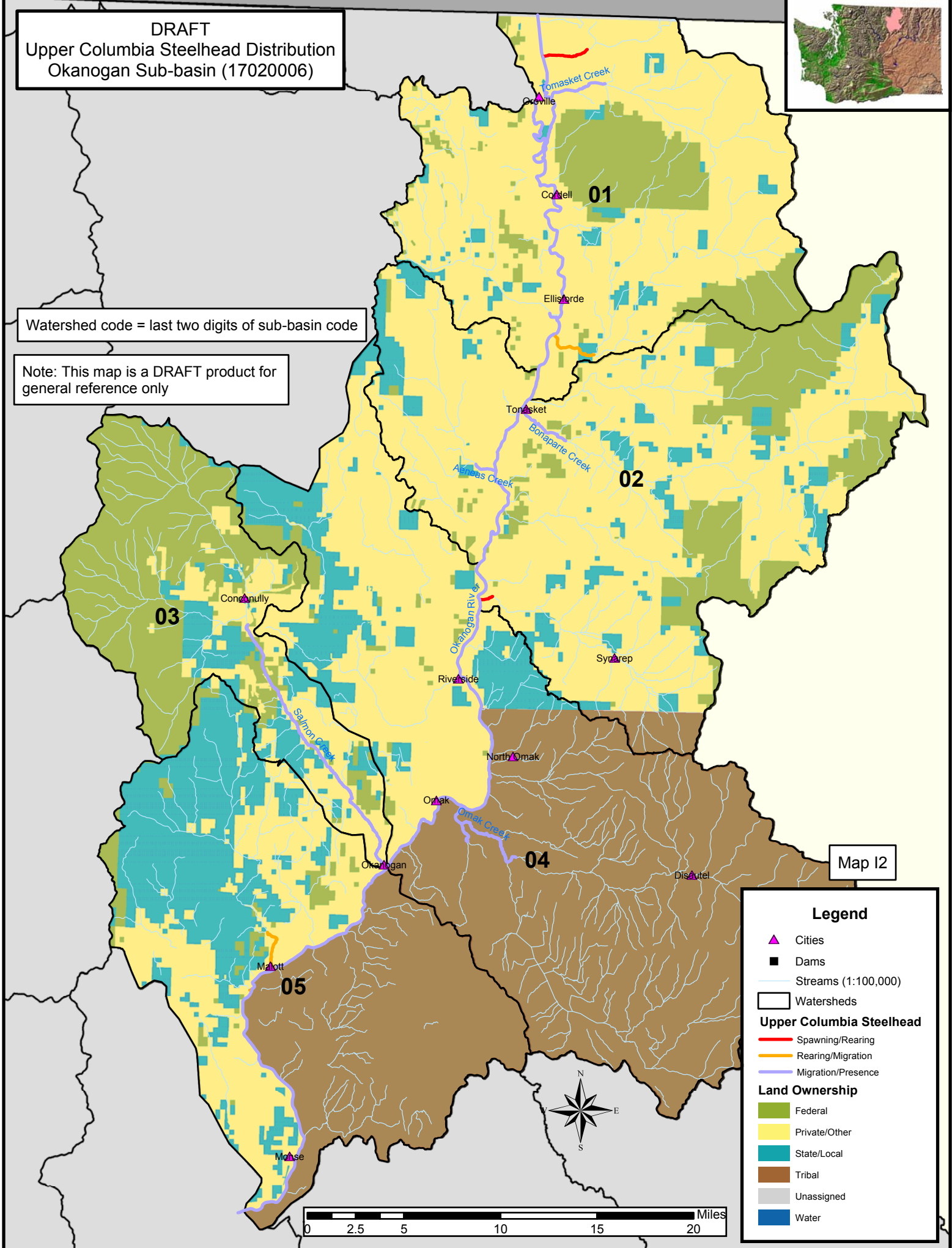


DRAFT
Upper Columbia Steelhead Distribution
Okanogan Sub-basin (17020006)



Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for general reference only

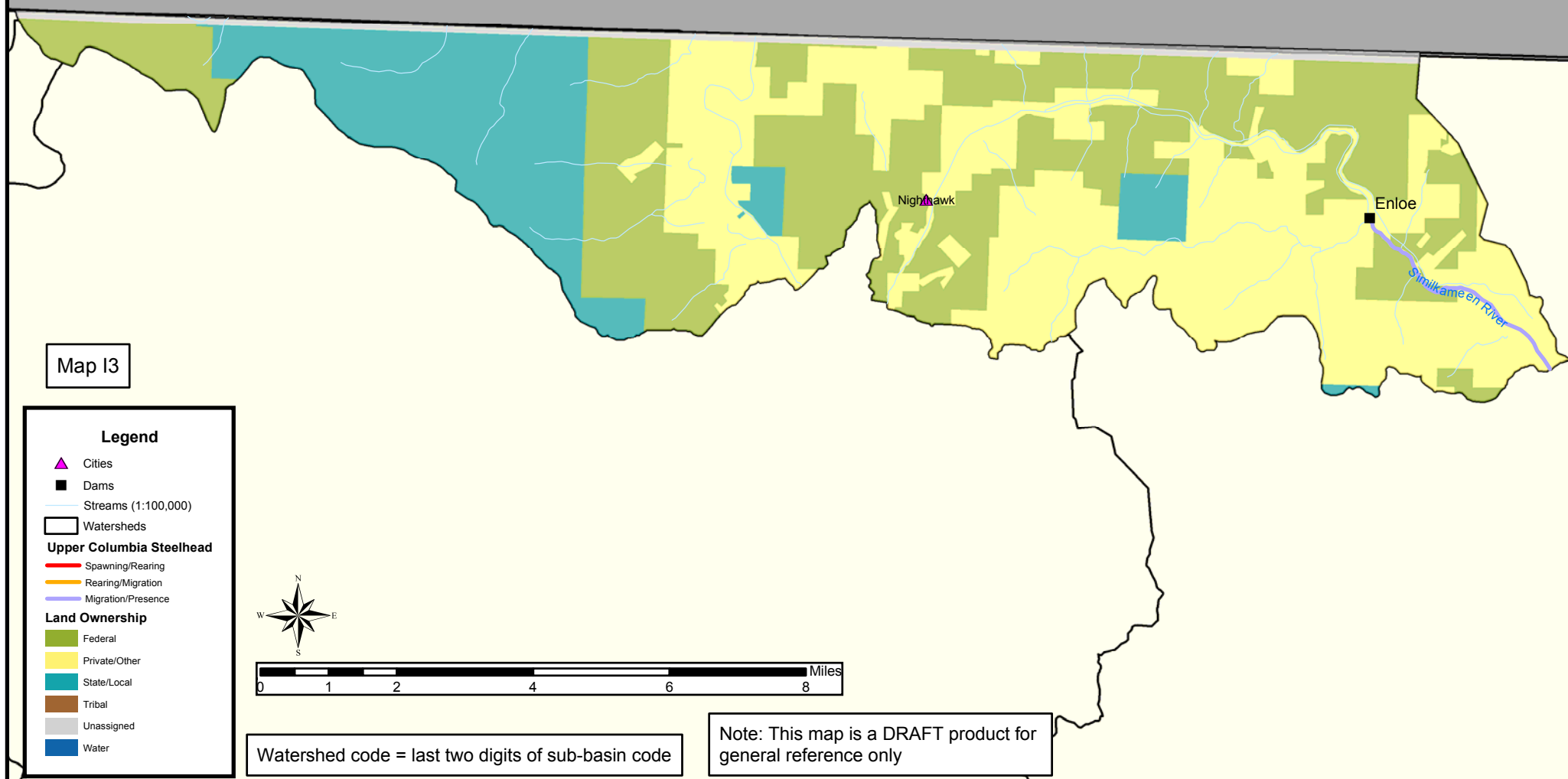
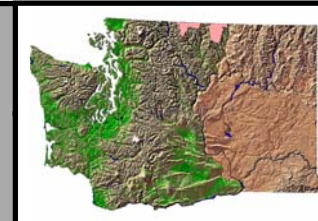


Map I2

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds
- Upper Columbia Steelhead**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence
- Land Ownership**
 - Federal
 - Private/Other
 - State/Local
 - Tribal
 - Unassigned
 - Water

DRAFT
Upper Columbia Steelhead Distribution
Similkameen Sub-basin (17020007)



Map I3

Legend

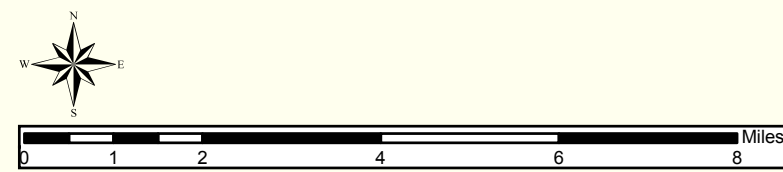
- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

Land Ownership

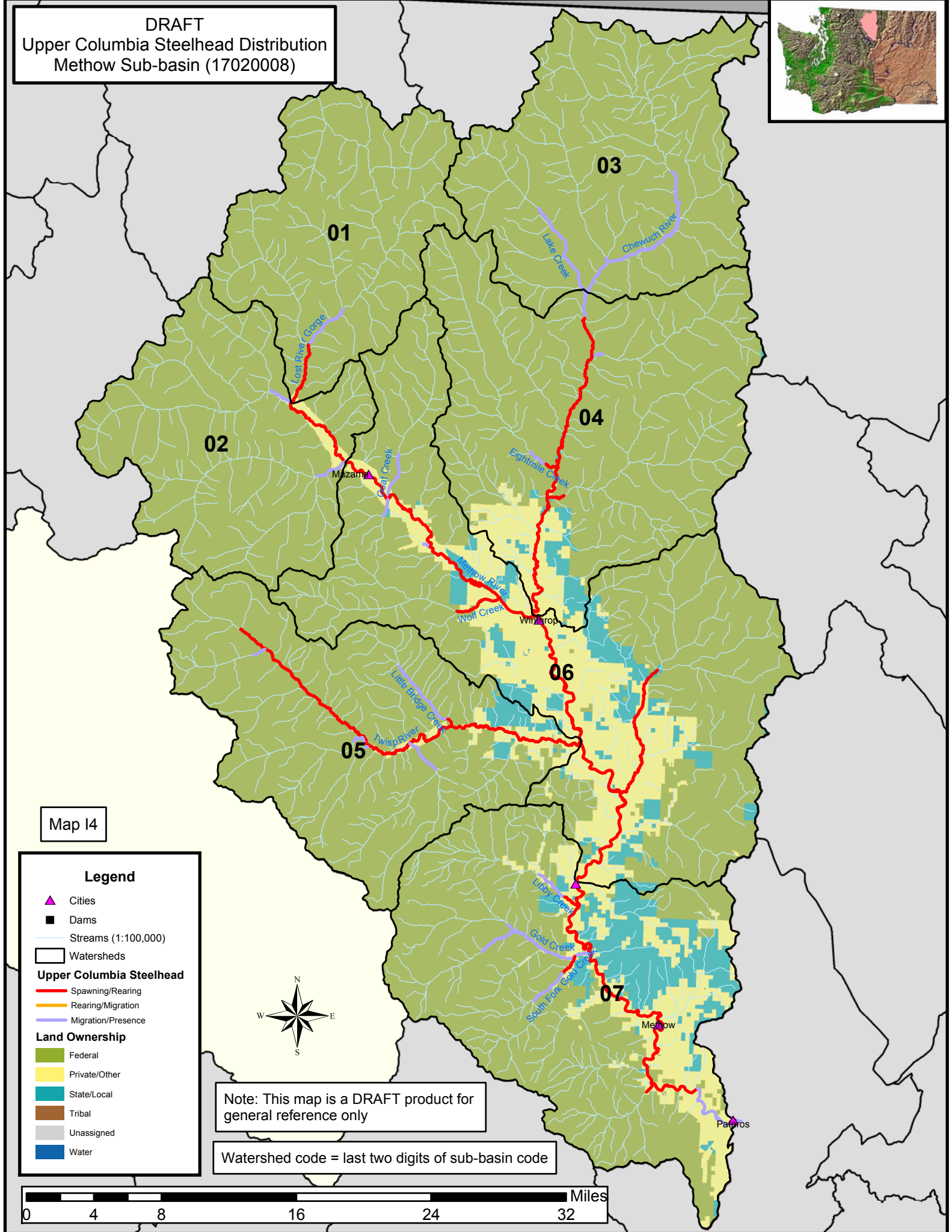
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water



Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for general reference only

DRAFT
Upper Columbia Steelhead Distribution
Methow Sub-basin (17020008)



Map I4

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

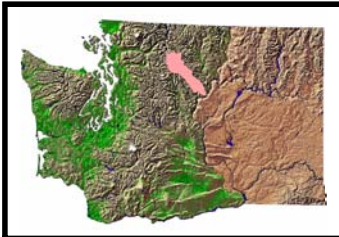
- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

Land Ownership

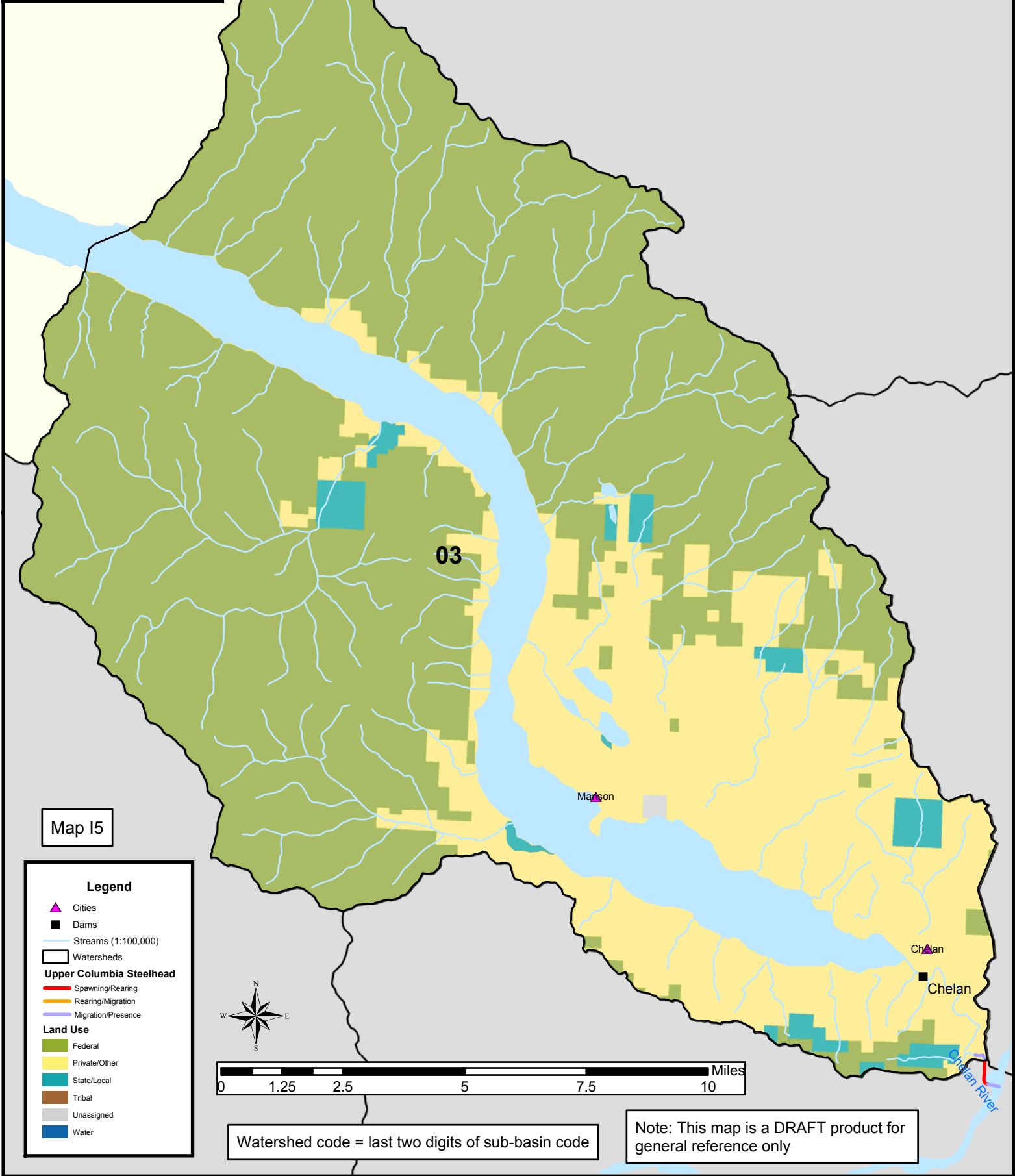
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code

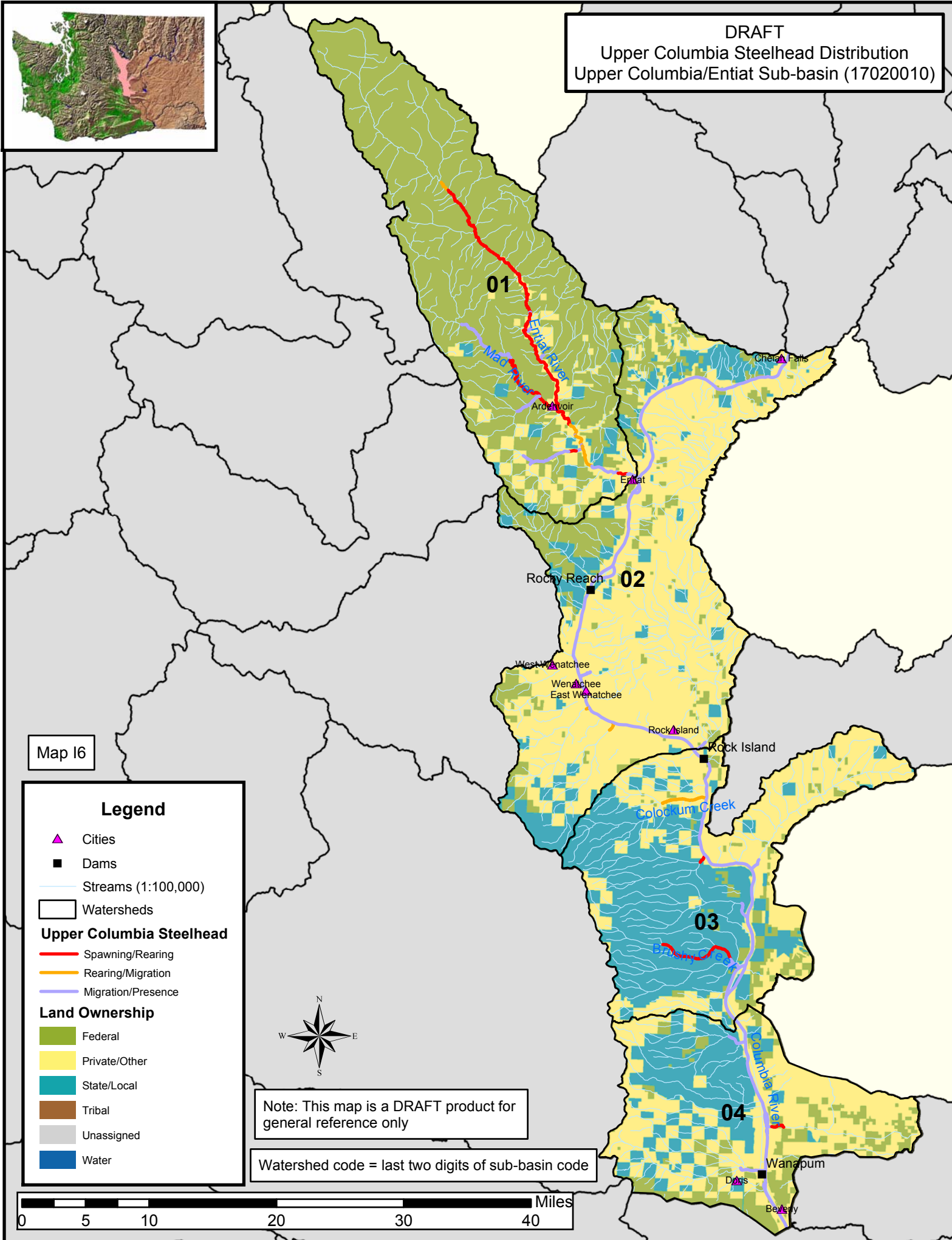


DRAFT
Upper Columbia Steelhead Distribution
Lake Chelan Sub-basin 17020009





DRAFT
Upper Columbia Steelhead Distribution
Upper Columbia/Entiat Sub-basin (17020010)



Map I6

Legend

- Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

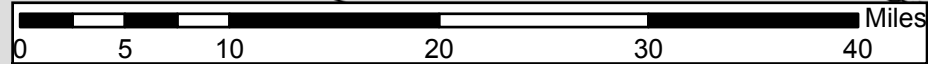
- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

Land Ownership

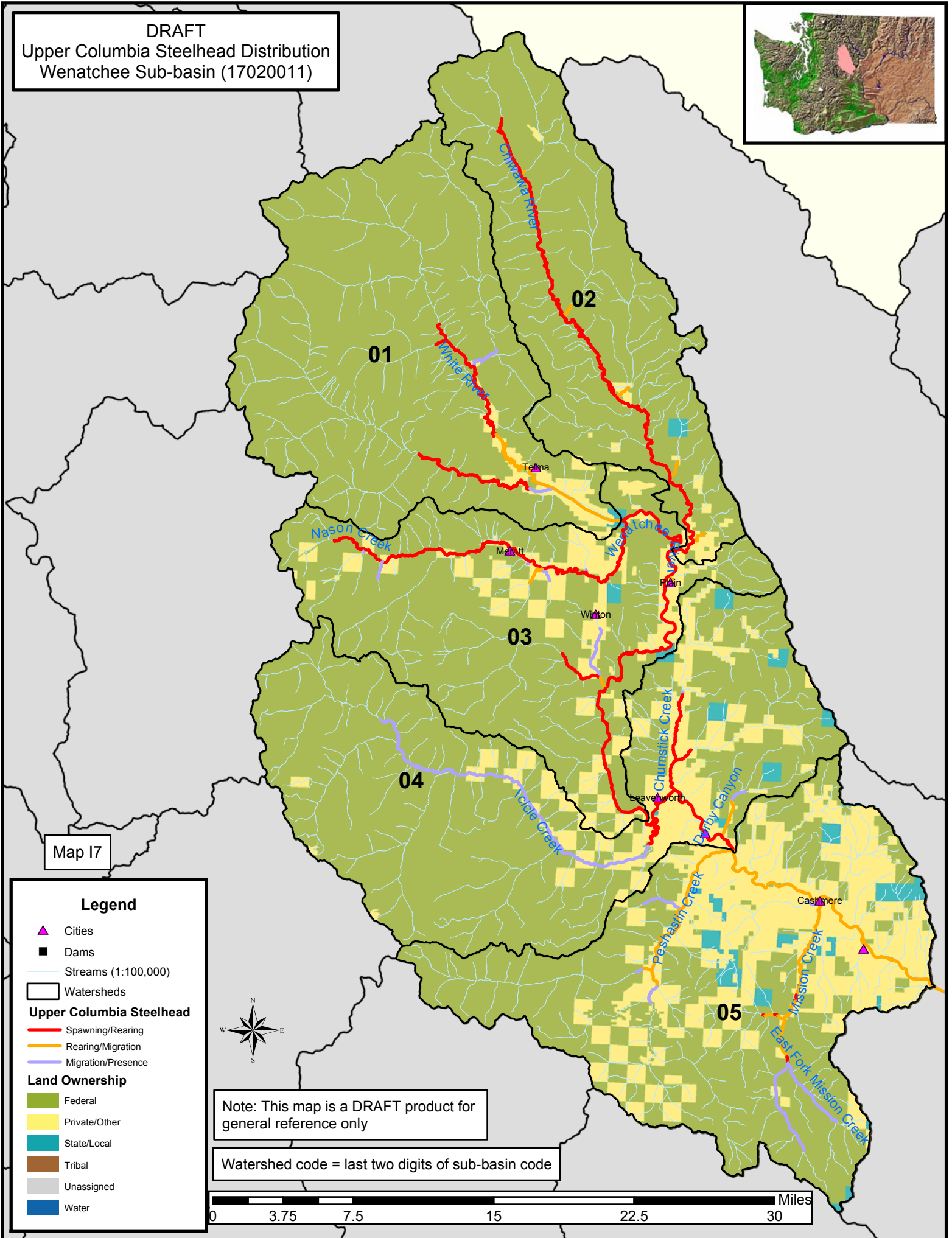
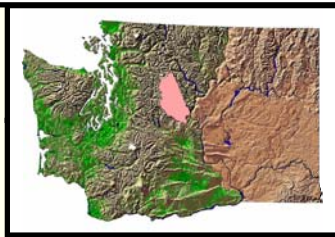
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code



DRAFT
Upper Columbia Steelhead Distribution
Wenatchee Sub-basin (17020011)



Map I7

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

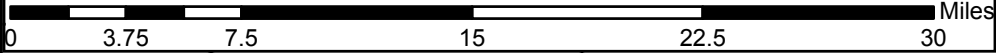
Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water



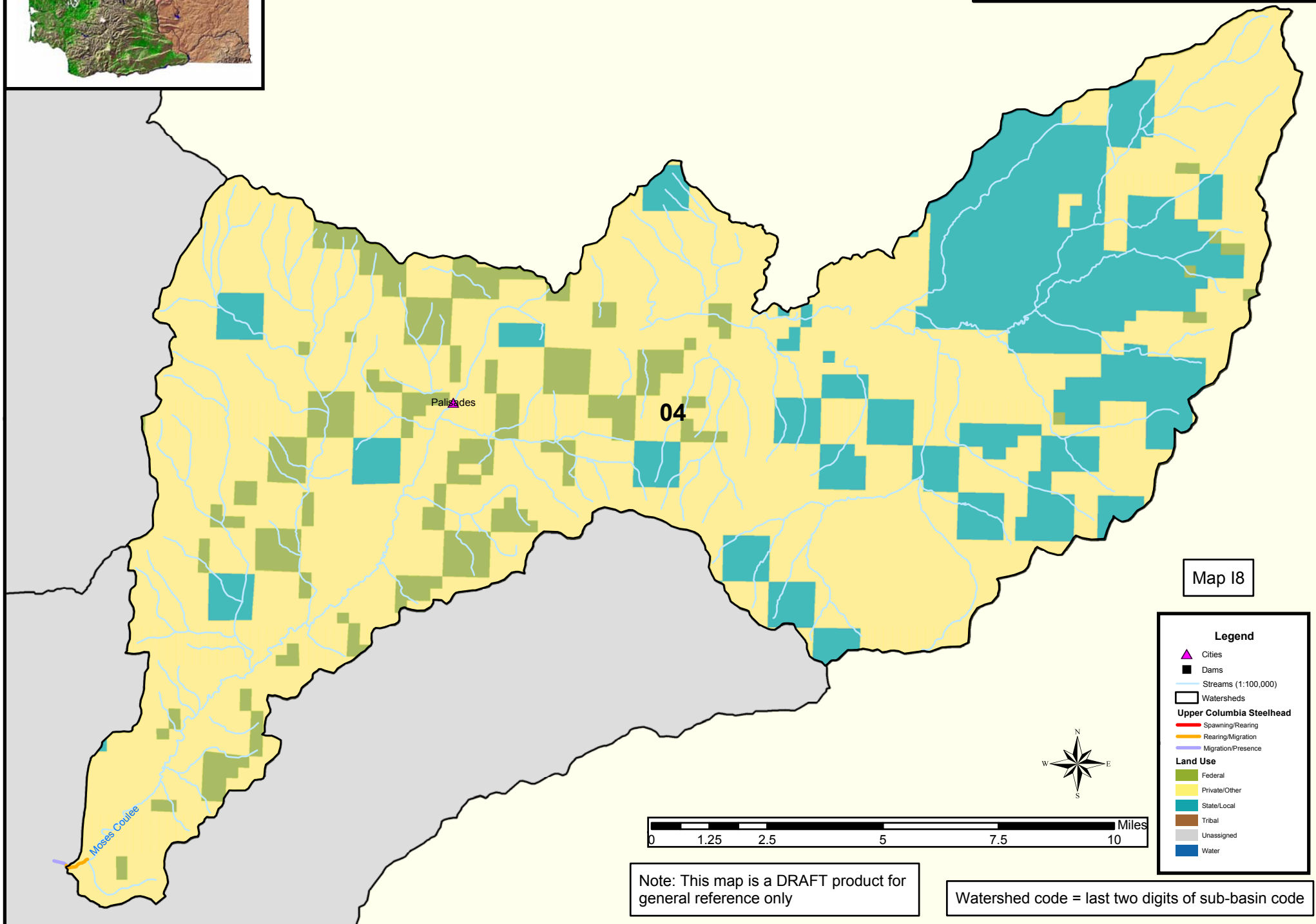
Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code





DRAFT
Upper Columbia Steelhead Distribution
Moses Coulee Sub-basin (17020012)



Map 18

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- Watersheds

Upper Columbia Steelhead

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

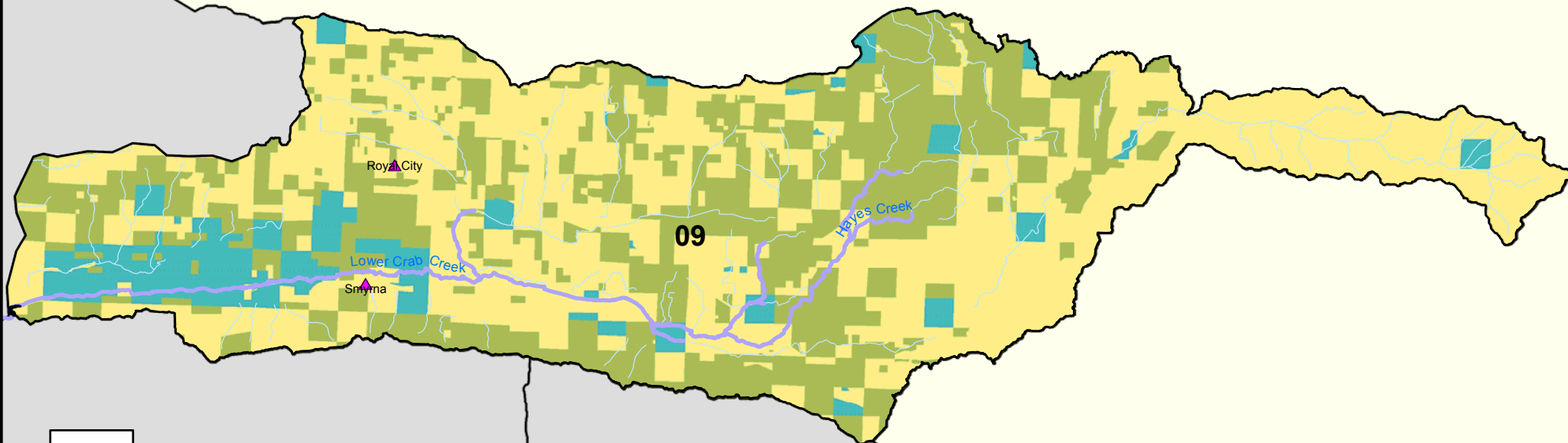
Land Use

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Note: This map is a DRAFT product for
general reference only

Watershed code = last two digits of sub-basin code

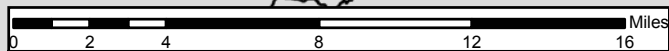
DRAFT
Upper Columbia Steelhead Distribution
Lower Crab Sub-basin (17020015)



Map I9

Legend

- ▲ Cities
- Dams
- Streams (1:100,000)
- ▭ Watersheds
- Upper Columbia Steelhead**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence
- Land Ownership**
 - Federal
 - Private/Other
 - State/Local
 - Tribal
 - Unassigned
 - Water

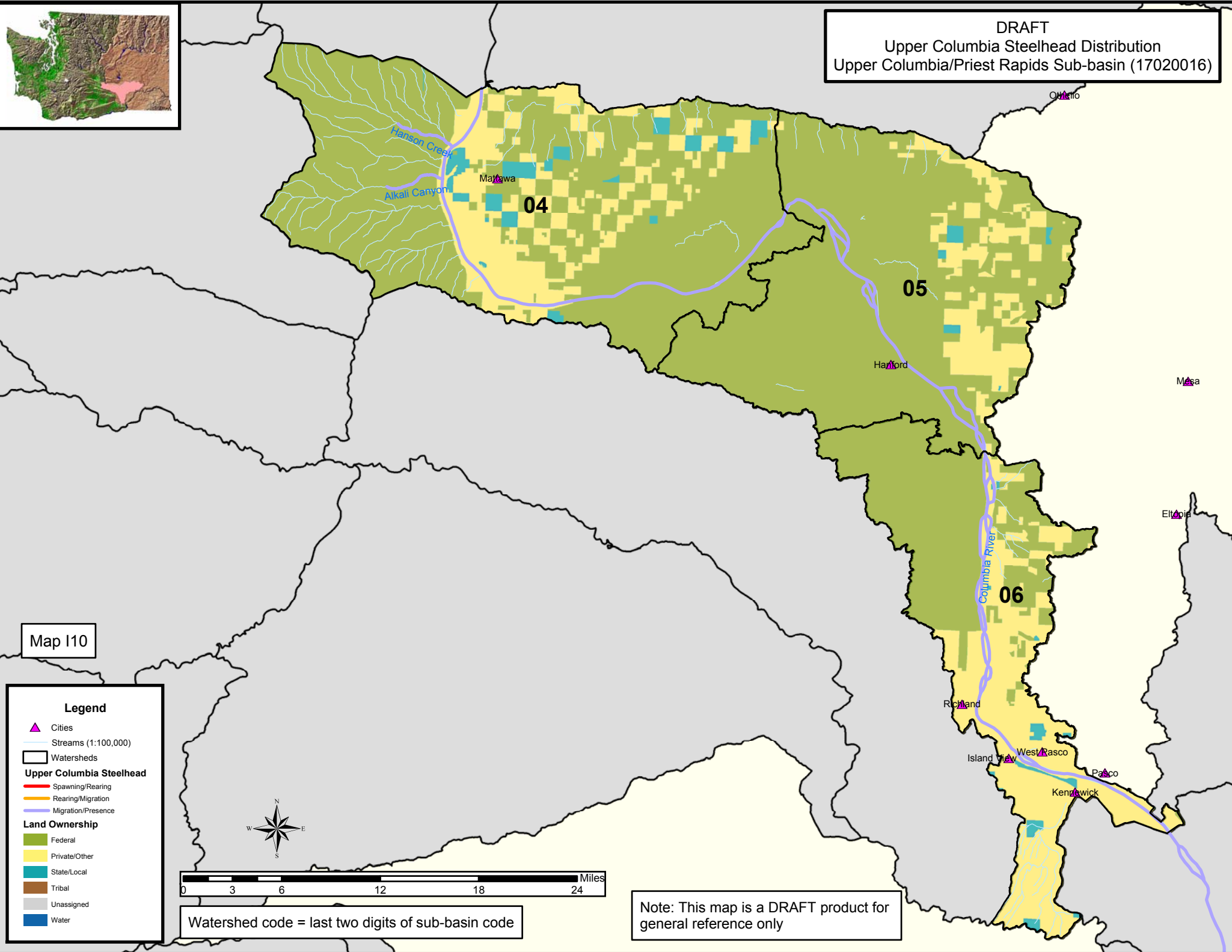


Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for
general reference only



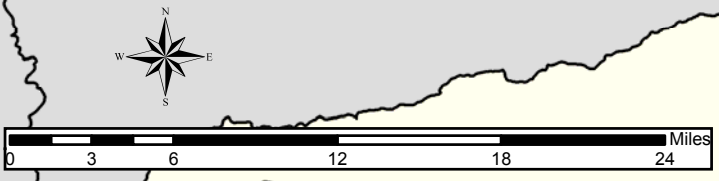
DRAFT
Upper Columbia Steelhead Distribution
Upper Columbia/Priest Rapids Sub-basin (17020016)



Map I10

Legend

- Cities
- Streams (1:100,000)
- Watersheds
- Upper Columbia Steelhead**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence
- Land Ownership**
 - Federal
 - Private/Other
 - State/Local
 - Tribal
 - Unassigned
 - Water



Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for general reference only